

INTERNATIONAL SEARCH REPORT

International Application No
PCT/FR2005/000093

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12N15/53 C12N15/80 C12N9/02 C12N1/15 C12P21/02
//(C12P21/02,C12R1:645)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12N C12P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, BIOSIS, MEDLINE, FSTA, EMBL, CHEM ABS Data, Sequence Search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| P,X | <p>ALVES ALEXANDRA M C R ET AL: "Highly efficient production of laccase by the basidiomycete Pycnoporus cinnabarinus" APPLIED AND ENVIRONMENTAL MICROBIOLOGY, vol. 70, no. 11, November 2004 (2004-11), pages 6379-6384, XP002341841 ISSN: 0099-2240 the whole document -& DATABASE EMBL 'Online! 1 February 2005 (2005-02-01), "Pycnoporus cinnabarinus laccase gene, promoter region, 5' UTR and partial cds." XP002341845 retrieved from EBI accession no. EM_FUN:AY534884 Database accession no. AY534884 the whole document</p> <p style="text-align: center;">----- -/--</p> | 1-20 |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *& document member of the same patent family

Date of the actual completion of the international search

23 August 2005

Date of mailing of the international search report

08/09/2005

Name and mailing address of the ISA

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 PCT/FR2005/000093

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | <p>MARTINEZ A T: "Fungal metalloenzymes oxidizing aromatic compounds of industrial interest" 'Online! 25 November 2003 (2003-11-25), XP002295843 Retrieved from the Internet: URL: http://www.cib.csic.es/lignina/pelas/pelas.html > 'retrieved on 2004-09-10! paragraph '0005!</p> | 1-20 |
| X | <p>LOMASCOLO A ET AL: "Overproduction of laccase by a monokaryotic strain of Pycnoporus cinnabarinus using ethanol as inducer." JOURNAL OF APPLIED MICROBIOLOGY, vol. 94, no. 4, 2003, pages 618-624, XP002295716 ISSN: 1364-5072 the whole document</p> | 1-5,7-9, 14-20 |
| X | <p>SIGOILLOT JEAN-CLAUDE ET AL: "Laccase production by a monokaryotic strain of Pycnoporus cinnabarinus derived from a dikaryotic strain" WORLD JOURNAL OF MICROBIOLOGY AND BIOTECHNOLOGY, vol. 15, no. 4, August 1999 (1999-08), pages 481-484, XP008035159 ISSN: 0959-3993 cited in the application the whole document</p> | 1-5,7-9, 14-20 |
| X | <p>OTTERBEIN LUDOVIC ET AL: "Molecular cloning of the cDNA encoding laccase from Pycnoporus cinnabarinus I-937 and expression in Pichia pastoris" EUROPEAN JOURNAL OF BIOCHEMISTRY, vol. 267, no. 6, March 2000 (2000-03), pages 1619-1625, XP002295717 ISSN: 0014-2956 the whole document</p> | 14-20 |
| A | <p>-& DATABASE EMBL 'Online! 24 November 1999 (1999-11-24), OTTERBEIN L ET AL: "Pycnoporus cinnabarinus laccase (LacI) gene, complete cds." XP002295722 Database accession no. AF170093 the whole document</p> | 1-13 |

-/--

INTERNATIONAL SEARCH REPORT

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| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | RECORD ERIC ET AL: "Expression of the Pycnoporus cinnabarinus laccase gene in Aspergillus niger and characterization of the recombinant enzyme" EUROPEAN JOURNAL OF BIOCHEMISTRY, vol. 269, no. 2, January 2002 (2002-01), pages 602-609, XP002295718 ISSN: 0014-2956 | 14-20 |
| A | the whole document | 1-13 |
| X | EGGERT CLAUDIA ET AL: "Molecular analysis of a laccase gene from the white rot fungus Pycnoporus cinnabarinus" APPLIED AND ENVIRONMENTAL MICROBIOLOGY, vol. 64, no. 5, May 1998 (1998-05), pages 1766-1772, XP002295719 ISSN: 0099-2240 | 14 |
| A | the whole document | 1-13, 15-20 |
| | -& DATABASE EMBL 'Online! 13 May 1998 (1998-05-13), EGGERT C ET AL: "Pycnoporus cinnabarinus laccase (lcc3-1) gene, complete cds." XP002295723 Database accession no. AF025481 the whole document | |
| A | US 6 551 797 B1 (PFALLER RUPERT ET AL) 22 April 2003 (2003-04-22) the whole document | 1-20 |
| X | HERPOEL ISABELLE ET AL: "Selection of Pycnoporus cinnabarinus strains for laccase production" FEMS MICROBIOLOGY LETTERS, vol. 183, no. 2, 15 February 2000 (2000-02-15), pages 301-306, XP002295720 ISSN: 0378-1097 the whole document | 1-5,7-9, 14-20 |
| A | SIGOILLOT C ET AL: "Lignocellulolytic and hemicellulolytic system of Pycnoporus cinnabarinus: Isolation and characterization of a cellobiose dehydrogenase and a new xylanase" ENZYME AND MICROBIAL TECHNOLOGY, vol. 31, no. 6, 1 November 2002 (2002-11-01), pages 876-883, XP002295721 ISSN: 0141-0229 the whole document | 1-20 |

-/--

INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| A | EP 0 300 466 A (CANGENE CORP) 25 January 1989 (1989-01-25) page 7, line 56 - page 8, line 8 ----- | 1-20 |
| A | SCHUREN FRANK H J ET AL: "Highly-efficient transformation of the homobasidiomycete Schizophyllum commune to phleomycin resistance" CURRENT GENETICS, vol. 26, no. 2, 1994, pages 179-183, XP008051258 ISSN: 0172-8083 figure 1 ----- | 1-20 |
| A | WESSELS J G H ET AL: "EXPRESSION OF DIKARYON-SPECIFIC AND NON-SPECIFIC MESSENGER RNA OF SCHIZOPHYLLUM-COMMUNE IN RELATION TO ENVIRONMENTAL CONDITIONS AND FRUITING" JOURNAL OF GENERAL MICROBIOLOGY, vol. 133, no. 9, 1987, pages 2557-2562, XP008051259 ISSN: 0022-1287 table 1 ----- | 1-20 |
| A | JP 2001 157586 A (IWATE PREFECTURE) 12 June 2001 (2001-06-12) sequences 1-5 ----- | 1-20 |
| A | DATABASE EMBL 'Online! 19 September 2000 (2000-09-19), "Pycnoporus cinnabarinus laccase (lac1) mRNA, complete cds." XP002341846 retrieved from EBI accession no. EM_FUN:AF152170 Database accession no. AF152170 the whole document ----- | 1-20 |

INTERNATIONAL SEARCH REPORT

International Application No
PCT/FR2005/000093

| Patent document cited in search report | | Publication date | Patent family member(s) | Publication date |
|---|----|---------------------|----------------------------|---------------------|
| US 6551797 | B1 | 22-04-2003 | DE 19814853 A1 | 21-10-1999 |
| | | | AT 220104 T | 15-07-2002 |
| | | | CA 2324443 A1 | 14-10-1999 |
| | | | CN 1303440 A ,C | 11-07-2001 |
| | | | DE 59901930 D1 | 08-08-2002 |
| | | | DK 1066393 T3 | 26-08-2002 |
| | | | WO 9951757 A1 | 14-10-1999 |
| | | | EP 1066393 A1 | 10-01-2001 |
| | | | JP 3585840 B2 | 04-11-2004 |
| | | | JP 2002510498 T | 09-04-2002 |
| EP 0300466 | A | 25-01-1989 | CA 1295566 C | 11-02-1992 |
| | | | AT 127840 T | 15-09-1995 |
| | | | DE 3854456 D1 | 19-10-1995 |
| | | | DE 3854456 T2 | 09-05-1996 |
| | | | EP 0300466 A1 | 25-01-1989 |
| | | | ES 2076152 T3 | 01-11-1995 |
| | | | US 5514590 A | 07-05-1996 |
| | | | US 5641663 A | 24-06-1997 |
| JP 2001157586 | A | 12-06-2001 | NONE | |

RAPPORT DE RECHERCHE INTERNATIONALE

Demande nationale No
PCT/FR2005/000093

A. CLASSEMENT DE L'OBJET DE LA DEMANDE

CIB 7 C12N15/53 C12N15/80 C12N9/02 C12N1/15 C12P21/02
//(C12P21/02,C12R1:645)

Selon la classification internationale des brevets (CIB) ou à la fois selon la classification nationale et la CIB

B. DOMAINES SUR LESQUELS LA RECHERCHE A PORTE

Documentation minimale consultée (système de classification suivi des symboles de classement)

CIB 7 C12N C12P

Documentation consultée autre que la documentation minimale dans la mesure où ces documents relèvent des domaines sur lesquels a porté la recherche

Base de données électronique consultée au cours de la recherche internationale (nom de la base de données, et si réalisable, termes de recherche utilisés)

EPO-Internal, WPI Data, PAJ, BIOSIS, MEDLINE, FSTA, EMBL, CHEM ABS Data, Sequence Search

C. DOCUMENTS CONSIDERES COMME PERTINENTS

| Catégorie * | Identification des documents cités, avec, le cas échéant, l'indication des passages pertinents | no. des revendications visées |
|-------------|---|-------------------------------|
| P,X | <p>ALVES ALEXANDRA M C R ET AL: "Highly efficient production of laccase by the basidiomycete Pycnoporus cinnabarinus" APPLIED AND ENVIRONMENTAL MICROBIOLOGY, vol. 70, no. 11, novembre 2004 (2004-11), pages 6379-6384, XP002341841 ISSN: 0099-2240 le document en entier -& DATABASE EMBL 'Online! 1 février 2005 (2005-02-01), "Pycnoporus cinnabarinus laccase gene, promoter region, 5' UTR and partial cds." XP002341845 extrait de EBI accession no. EM_FUN:AY534884 Database accession no. AY534884 le document en entier</p> <p style="text-align: center;">----- -/--</p> | 1-20 |

☒ Voir la suite du cadre C pour la fin de la liste des documents

☒ Les documents de familles de brevets sont indiqués en annexe

* Catégories spéciales de documents cités:

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- "Y" document particulièrement pertinent; l'invention revendiquée ne peut être considérée comme impliquant une activité inventive lorsque le document est associé à un ou plusieurs autres documents de même nature, cette combinaison étant évidente pour une personne du métier
- "&" document qui fait partie de la même famille de brevets

Date à laquelle la recherche internationale a été effectivement achevée

23 août 2005

Date d'expédition du présent rapport de recherche internationale

08/09/2005

Nom et adresse postale de l'administration chargée de la recherche internationale
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Fonctionnaire autorisé

Devijver, K

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| C.(suite) DOCUMENTS CONSIDERES COMME PERTINENTS | | |
|---|---|-------------------------------|
| Catégorie | Identification des documents cités, avec, le cas échéant, l'indication des passages pertinents | no. des revendications visées |
| X | MARTINEZ A T: "Fungal metalloenzymes oxidizing aromatic compounds of industrial interest" 'Online! 25 novembre 2003 (2003-11-25), XP002295843 Extrait de l'Internet: URL: http://www.cib.csic.es/lignina/pelas/pelas.html > 'extrait le 2004-09-10! alinéa '0005! | 1-20 |
| X | LOMASCOLO A ET AL: "Overproduction of laccase by a monokaryotic strain of Pycnoporus cinnabarinus using ethanol as inducer." JOURNAL OF APPLIED MICROBIOLOGY, vol. 94, no. 4, 2003, pages 618-624, XP002295716 ISSN: 1364-5072 le document en entier | 1-5,7-9, 14-20 |
| X | SIGOILLOT JEAN-CLAUDE ET AL: "Laccase production by a monokaryotic strain of Pycnoporus cinnabarinus derived from a dikaryotic strain" WORLD JOURNAL OF MICROBIOLOGY AND BIOTECHNOLOGY, vol. 15, no. 4, août 1999 (1999-08), pages 481-484, XP008035159 ISSN: 0959-3993 cité dans la demande le document en entier | 1-5,7-9, 14-20 |
| X | OTTERBEIN LUDOVIC ET AL: "Molecular cloning of the cDNA encoding laccase from Pycnoporus cinnabarinus I-937 and expression in Pichia pastoris" EUROPEAN JOURNAL OF BIOCHEMISTRY, vol. 267, no. 6, mars 2000 (2000-03), pages 1619-1625, XP002295717 ISSN: 0014-2956 le document en entier | 14-20 |
| A | -& DATABASE EMBL 'Online! 24 novembre 1999 (1999-11-24), OTTERBEIN L ET AL: "Pycnoporus cinnabarinus laccase (Lac1) gene, complete cds." XP002295722 Database accession no. AF170093 le document en entier | 1-13 |

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| X | <p>RECORD ERIC ET AL: "Expression of the Pycnoporus cinnabarinus laccase gene in Aspergillus niger and characterization of the recombinant enzyme" EUROPEAN JOURNAL OF BIOCHEMISTRY, vol. 269, no. 2, janvier 2002 (2002-01), pages 602-609, XP002295718 ISSN: 0014-2956</p> | 14-20 |
| A | <p>le document en entier</p> | 1-13 |
| X | <p>EGGERT CLAUDIA ET AL: "Molecular analysis of a laccase gene from the white rot fungus Pycnoporus cinnabarinus" APPLIED AND ENVIRONMENTAL MICROBIOLOGY, vol. 64, no. 5, mai 1998 (1998-05), pages 1766-1772, XP002295719 ISSN: 0099-2240</p> | 14 |
| A | <p>le document en entier</p> | 1-13, 15-20 |
| | <p>-& DATABASE EMBL 'Online! 13 mai 1998 (1998-05-13), EGGERT C ET AL: "Pycnoporus cinnabarinus laccase (lcc3-1) gene, complete cds." XP002295723 Database accession no. AF025481 le document en entier</p> | |
| A | <p>US 6 551 797 B1 (PFALLER RUPERT ET AL) 22 avril 2003 (2003-04-22) le document en entier</p> | 1-20 |
| X | <p>HERPOEL ISABELLE ET AL: "Selection of Pycnoporus cinnabarinus strains for laccase production" FEMS MICROBIOLOGY LETTERS, vol. 183, no. 2, 15 février 2000 (2000-02-15), pages 301-306, XP002295720 ISSN: 0378-1097 le document en entier</p> | 1-5,7-9, 14-20 |
| A | <p>SIGOILLOT C ET AL: "Lignocellulolytic and hemicellulolytic system of Pycnoporus cinnabarinus: Isolation and characterization of a cellobiose dehydrogenase and a new xylanase" ENZYME AND MICROBIAL TECHNOLOGY, vol. 31, no. 6, 1 novembre 2002 (2002-11-01), pages 876-883, XP002295721 ISSN: 0141-0229 le document en entier</p> | 1-20 |
| | -/-- | |

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| A | SCHUREN FRANK H J ET AL: "Highly-efficient transformation of the homobasidiomycete Schizophyllum commune to phleomycin resistance" CURRENT GENETICS, vol. 26, no. 2, 1994, pages 179-183, XP008051258 ISSN: 0172-8083 figure 1 ----- | 1-20 |
| A | WESSELS J G H ET AL: "EXPRESSION OF DIKARYON-SPECIFIC AND NON-SPECIFIC MESSENGER RNA OF SCHIZOPHYLLUM-COMMUNE IN RELATION TO ENVIRONMENTAL CONDITIONS AND FRUITING" JOURNAL OF GENERAL MICROBIOLOGY, vol. 133, no. 9, 1987, pages 2557-2562, XP008051259 ISSN: 0022-1287 tableau 1 ----- | 1-20 |
| A | JP 2001 157586 A (IWATE PREFECTURE) 12 juin 2001 (2001-06-12) séquences 1-5 ----- | 1-20 |
| A | DATABASE EMBL 'Online! 19 septembre 2000 (2000-09-19), "Pycnoporus cinnabarinus laccase (lac1) mRNA, complete cds." XP002341846 extrait de EBI accession no. EM_FUN:AF152170 Database accession no. AF152170 le document en entier ----- | 1-20 |

RAPPORT DE RECHERCHE INTERNATIONALE

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PCT/FR2005/000093

| Document brevet cité au rapport de recherche | | Date de publication | Membre(s) de la famille de brevet(s) | Date de publication |
|---|----|------------------------|---|------------------------|
| US 6551797 | B1 | 22-04-2003 | DE 19814853 A1 | 21-10-1999 |
| | | | AT 220104 T | 15-07-2002 |
| | | | CA 2324443 A1 | 14-10-1999 |
| | | | CN 1303440 A ,C | 11-07-2001 |
| | | | DE 59901930 D1 | 08-08-2002 |
| | | | DK 1066393 T3 | 26-08-2002 |
| | | | WO 9951757 A1 | 14-10-1999 |
| | | | EP 1066393 A1 | 10-01-2001 |
| | | | JP 3585840 B2 | 04-11-2004 |
| | | | JP 2002510498 T | 09-04-2002 |
| EP 0300466 | A | 25-01-1989 | CA 1295566 C | 11-02-1992 |
| | | | AT 127840 T | 15-09-1995 |
| | | | DE 3854456 D1 | 19-10-1995 |
| | | | DE 3854456 T2 | 09-05-1996 |
| | | | EP 0300466 A1 | 25-01-1989 |
| | | | ES 2076152 T3 | 01-11-1995 |
| | | | US 5514590 A | 07-05-1996 |
| | | | US 5641663 A | 24-06-1997 |
| JP 2001157586 | A | 12-06-2001 | AUCUN | |